Describing functioning and health after spinal cord injury in the light of psychological-personal factors

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Abstract: Objective: To describe and explore functioning and health of persons with spinal cord injury from the perspective of psychological-personal factors in the light of the International Classification of Functioning, Disability and Health (ICF) framework. Methods: Data from 511 participants regarding feelings, thoughts and beliefs, motives, and patterns of experience and behaviour were analysed. Measurement instruments included the Mental Health Index-5, Positive and Negative Affect Schedule, Hospital Anxiety and Depression Scale, Appraisal of Life Events Scale, 5 items from the World Health Organization Quality of Life Scale, Purpose in Life Test-Short Form, General Self-Efficacy Scale, Big Five Inventory-21, Social Skills Inventory-SF, Brief COPE. The distribution of the selected psychological-personal factors-indicators was examined using descriptive statistics. Differences between SCI subgroups by sex, age, age at injury, time since injury, aetiology and severity of injury were explored using analysis of variance (ANOVA) and F-tests. Results: Participants who were older and sustained their spinal cord injury more recently experienced more depressed mood, less positive affect, less challenge appraisal, lower life satisfaction, lower purpose in life, and lower self-efficacy. They reported lower social skills, less usage of the coping strategies humour, positive reframing, and acceptance, and more usage of the coping strategies denial and self-distraction. Overall, effect sizes were small. Discussion: Although study participants appeared to be well adjusted to spinal cord injury, those who sustained their injury at an older age and more recently reported more negative experiences. Quantitative description and exploration of the psychological-personal aspects of health will enable hypotheses to be formulated for further research, and suggest a need for tailored interventions for those at risk of less favourable outcomes.

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ORIGINAL REPORT

DESCRIBING FUNCTIONING AND HEALTH AFTER SPINAL CORD INJURY IN THE LIGHT OF PSYCHOLOGICAL–PERSONAL FACTORS

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Discussion: **Although study participants appeared to be well adjusted to spinal cord injury, those who sustained their injury at an older age and more recently reported more negative experiences. Quantitative description and exploration of the psychological-personal aspects of health will enable hypotheses to be formulated for further research, and suggest a need for tailored interventions for those at risk of less favourable outcomes.**

Key words: spinal cord injury; International Classification of Functioning Disability and Health; psychological factors; personal factors.

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INTRODUCTION

Spinal cord injury (SCI) is a potentially life-threatening and profoundly life-changing health condition (1), which can have a significant impact on a person's physical, psychological and social functioning. Complications, such as pain, bowel and bladder problems, muscle spasms, fatigue, osteoporosis and pressure sores, may occur (2). SCI may be associated with symptoms of depression and anxiety (3, 4), post-traumatic stress (5), substance abuse and suicidal behaviour (3). In addition, work, leisure and daily activities, relationships and participation (6–10) may change due to SCI.

Adjusting to the physical, psychological and social consequences of a SCI is a challenge for the affected individuals. Research shows that variations in adjustment to SCI are not well-predicted by biological factors, such as the severity of the injury or resulting impairments (11–13), implying that psychological and social factors might be better predictors.

Theory indicates that how an individual adjusts to an adverse event like SCI depends on their subjective experience and evaluation of the situation rather than only on the objective circumstances (14, 15). In other words, the individual's beliefs, attitudes, expectations, emotional reactions, motivational structure and behavioural strategies can influence the adjustment process and are expected to determine health-related outcomes.

Empirical evidence on the role of individual psychological factors in adjusting to SCI has been summarized (3, 16–18). Findings indicate that cognitive appraisals significantly explain the variance in mental health (19) and psychological well-being (20, 21), but less consistently explain quality of life and life satisfaction (22). Persons with SCI and high self-efficacy (23–26) or purpose in life (27–29) report higher well-being and life satisfaction. Coping has been found to be related to mental health, participation and quality of life in SCI (3, 30); however, depending on the coping style, the results are inconsistent (22, 31, 32). Individuals with SCI who display stronger social skills (33–36), higher self-efficacy (37–44), higher emotional stability, agreeableness, extraversion, conscientiousness or openness show lower levels of depression and anxiety (45) and higher levels of participation (23, 46, 47).

The evidence on the role of individual psychological factors appears to be extensive, but contradictory, and only a few studies have considered the complex interrelations of the various components that may contribute to adjustment outcomes

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following SCI (31, 48–51). In addition, generalizations from research in SCI may be limited due to small sample sizes, sampling biases, low response rates, and the difficulty of comparing results due to the use of different operationalizations and measurements of psychological factors (17, 18).

However, individual psychological factors are important in order to comprehensively describe the functioning and health of individuals with SCI. Based on this description, research questions can be addressed, such as: "Who is at risk of negative outcomes and why?", and "Which individual features relate how much to functioning?". The answers to these questions can inform health professionals in developing interventions to enhance health, functioning and well-being of individuals with SCI.

Description of the full range of relevant factors builds the basis for a comprehensive understanding of functioning and health of individuals with SCI. The model of the World Health Organization's International Classification of Functioning, Disability and Health (ICF) (52) posits interactions between dimensions of functioning (i.e. body, individual, social) and stresses the role of environmental and personal contextual factors as determinants of the extent of disability. The ICF can represent functioning and health of persons with SCI in a comprehensive manner from different perspectives, e.g. from a biomedical perspective, a social-environmental perspective, and a psychological–personal perspective.

A systematic approach to capture the individual psychological perspective on SCI in the light of the ICF has been proposed by Geyh (53). Based on this approach, the following 4 areas of psychological-personal factors (PPFs) can be considered for comprehensive understanding of individual functioning, health and well-being: Feelings, Thoughts and Beliefs, Motives, and Patterns of Experience and Behaviour. Presumably, various PPFs may be components, determinants, or even effects, of adjustment.

The overall objective of this paper is to describe and quantitatively explore functioning and health of persons with SCI with respect to these 4 areas of PPFs in the light of the ICF framework.

The specific aims of this paper are: (*i*) to report on the distribution of selected PPFs in the study population; and (*ii*) to explore differences in PPFs between SCI subgroups by sex, age, age at injury, time since injury, aetiology and severity of injury.

METHODS

This study is part of a nationwide community-based cross-sectional survey conducted within the Swiss Spinal Cord Injury Cohort Study (SwiSCI) (54, 55). The SwiSCI was conducted in collaboration with the 4 specialized SCI rehabilitation clinics in Switzerland, including the Spinal Cord Injury Center of Balgrist University Hospital, Zürich; the Centre for Spinal Cord Injury and Severe Head Injury, REHAB Basel; the Clinique Romande de Réadaptation CRR, Sion; and the Swiss Paraplegic Centre (SPZ), Nottwil. Further participating organizations include the Swiss Paraplegic Association (SPV); the home nursing service organization ParaHelp; and the Swiss Accident Insurance Corporation (SUVA). SwiSCI received approval from the cantonal ethics committees.

SwiSCI aimed to include all community-dwelling persons aged 16 years or older with permanent residence in Switzerland and a diagnosis of traumatic or non-traumatic SCI. SwiSCI excluded persons with congenital conditions leading to para- or tetraplegia, including spina bifida, new SCI in the context of palliative (end-of-life) care, neurodegenerative disorders including multiple sclerosis (MS) and amyotrophic lateral sclerosis (ALS), or Guillain-Barré syndrome.

Data were collected in 3 waves from September 2011 to March 2013. In the first wave, study information, informed consent form and a first questionnaire assessing sociodemographic and lesion-related characteristics were mailed to all eligible persons. Persons who returned a signed consent form and the first questionnaire received a second-wave questionnaire about health, functioning, participation and well-being. With protections of privacy and following the ethical protocol, the collaborating organisations were able to provide the study centre with anonymized data about the non-participants, including date of injury, age, sex, type of lesion and language, which made it possible to investigate non-response bias (56). In the third wave, 3 randomized samples, stratified by sex, age, and level of lesion (para- vs. tetraplegia) were drawn from the respondents of the second-wave questionnaire. Each of the 3 samples received a different module. PPFs were assessed in the Psychological Personal Factors and Health Behaviour (PPFs-HB) module of the third wave (54).

SwiSCI initially contacted 3144 potential participants for data collection. Response rate in the first wave questionnaire was 61.4%, in the second 82.6%, and in the third 87.6%, which resulted in the present sample of $n = 511$. As shown in Table I, 27% of the sample was female. Mean age was 52.9 years and participants had lived for a mean of 17 years with paraplegia (69%) or tetraplegia (31%).

Variables and instruments

Sociodemographic, injury-related and information on PPFs were assessed. Sociodemographic characteristics included age, sex, years of education, marital status, and language of the questionnaire. Injury-related information collected was: age at injury, time since injury, type of lesion (complete/incomplete, para/tetraplegia), cause of injury (traumatic/non-traumatic). The ICF-based framework by Geyh (53) was used to capture PPFs areas, including Feelings, Thoughts and Beliefs, Motives, Patterns of Experience and Behaviour. Validated German, French and Italian versions of the measures were used. French and Italian versions of the Purpose in Life Test-Short Form (PIL-SF) and the Appraisal of Life Events Scale (ALE) were translated according to World Health Organization (WHO) guidelines (57) by the SwiSCI team. The following self-report measures were used to assess PPFs (Table II).

Feelings

The PPF area Feelings was addressed using the following 3 measures related to feelings and mood.

Mental Health Index. The MHI-5 is 1 of 8 scales included in the 36-item Short Form health survey (SF-36) (58). The subscale consists of 5 items assessing frequency of feeling nervous, down in the dumps, calm and peaceful, downhearted and blue, and happy. Responses are given on a 5-point Likert scale ("all" to "none of the time"). Evidence concerning validity and reliability supports the use of the MHI-5 in individuals with disabilities (59). In contrast to the other measures of PPFs, the MHI was assessed in the second wave of data collections.

Positive and Negative Affect Schedule. The PANAS (60) is a 20-item measure of positive affect (PANAS-PA) and negative affect (PANAS-NA) (61). Respondents are asked to rate the extent to which they have experienced 10 particular positive (e.g. enthusiasm) and 10 negative emotions (e.g. distress) on a 5-point Likert scale ("very slightly or not at all" to "very much"). The PANAS has evidence supporting its validity and reliability in a rehabilitation population (62).

Table I. *Descriptive characteristics of study participants (*n = *511)*

Characteristic	*n* (%)	Mean (SD)	Median	*n* (%) missing
Sex				
Male	371 (72.6)			
Female	140 (27.4)			
Age, years		52.9 (14.8)	53	
Age at injury, years		35.4 (17.6)	32	5 (1.0)
Time since injury, years		17.45 (13.06)	14	5 (1.0)
Age at injury and time since injury groups				5 (1.0)
Younger at and shorter time since injury	61 (11.9)			
Younger at and longer time since injury	189 (37.0)			
Older at and shorter time since injury	192 (37.6)			
Older at and longer time since injury	64 (12.5)			
Type of lesion				3 (0.5)
Complete paraplegia	166 (32.5)			
Complete tetraplegia	56 (11.0)			
Incomplete paraplegia	184 (36.0)			
Incomplete tetraplegia	102 (20.0)			
Cause of injury				2 (0.4)
Traumatic	400 (78.3)			
Non-traumatic	109 (21.3)			
Education, years		13.8 (3.3)		12 (2.4)
Marital status				5 (1.0)
Single (never married)	158 (30.9)			
Married	255 (49.9)			
Widowed	68 (13.3)			
Divorced	23 (4.5)			
Registered Partnership	2 (0.4)			
Language of questionnaire				
German	361 (70.7)			
French	129 (25.2)			
Italian	21 (4.1)			

SD: standard deviation.

Hospital Anxiety and Depression Scale. HADS-D is a 7-item depression subscale of the Hospital Anxiety and Depression Scale (63) that assesses mood and affect-related (but not somatic) symptoms of depression. Responses are given on a 0–3 Likert scale, with higher scores indicating more severe depressive symptoms. The HADS-D has been found to be reliable and valid in measuring symptom severity of depression in individuals with SCI (64). Scores between 8 and 10 are considered as mild cases, 11–15 moderate cases, and 16 or above severe cases of depression (63, 65).

Thoughts and Beliefs

The PPF area Thoughts and Beliefs was addressed by 2 measures of cognitive appraisal and evaluations of life's challenges and quality:

Appraisal of Life Events Scale. The ALE (66) consists of 16 adjectives that represent cognitive appraisals of stressful life-events on 3 dimensions: threat (e.g. "terrifying"), challenge (e.g. "stimulating") and loss (e.g. "depressing"). Respondents rate the extent to which the adjectives describe their concerns on a 6-point Likert scale ("not at all" to "very much so"). The ALE has been frequently applied in SCI population (67, 68) and was found to be reliable and valid in measuring appraisal in the general population (66, 69).

WHO Quality of Life Scale. Five selected items of the WHOQoL-BREF ask respondents to rate their overall quality of life, satisfaction with health, daily activities, relationships, and living conditions on a 5-point response scale. The mean score is used for analyses. The selected items were found to be reliable and valid to assess quality of life in individuals with SCI (70–72).

Motives

The PPF area Motives was represented by the Purpose in Life Test-Short Form (PIL-SF) (73, 74). Respondents are asked to answer 4 questions regarding their life goals, purpose and their progress in achieving life goals on a 7-step rating scale. The PIL-SF demonstrated good reliability and validity (73).

Patterns of Experience and Behavior

The PPF area Patterns of Experience and Behavior was represented using the following 4 measures of thought patterns, traits, skills and strategies.

General Self-Efficacy Scale. The GSE consists of 10 items assessing a broad and stable sense of personal competence to deal with stressful situations (75) rated on a 4-point Likert scale. The GSE was found reliable and valid (75–77) and has been frequently used in SCI research (78).

Big Five Inventory. The 21-item BFI-21 (79) measures the personality traits extraversion, neuroticism, agreeableness, conscientiousness and openness to experiences. Respondents are asked to indicate the extent to which they agree or disagree with 21 statements about their personality characteristics. A 5-point Likert scale ("strongly disagree" to "strongly agree") is used. The BFI-21 has been found reliable and valid in assessing personality traits (79).

Social Skills Inventory – Short Form. The SSI-SF (80, 81) assesses elements of social skills (i.e. expressivity, sensitivity, control). Responses are given on a 5-point Likert-Scale ("not at all like me" to "exactly like me"). The original SSI has been found to have good content validity and acceptable internal consistency in the general population (82).

Brief COPE. The BriefCOPE (83) is an abbreviated version of the COPE Inventory (84) and measures ways of coping with problems and stress. It consists of 28 items that represent 14 subscales (self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioural disengagement, venting, positive reframing, planning, humour, acceptance, religion, self-blame). Higher scores refer to higher frequency of using a specific coping strategy. The COPE is frequently used in the SCI population (e.g. 83). Reliability and validity have been found acceptable (83, 86).

Analyses

To report on the distribution of the selected PPFs in the SwiSCI population, measures of central tendency (mean and median) and measures of dispersion (standard deviation (SD), 1st and 3rd quartiles) were calculated using sum scores of all the measures. To evaluate the shape of the statistical distributions of the scores, kurtosis and skewness, the percentage of minimum and maximum scorers in the sample were calculated, and the normality of the distributions was tested using Shapiro–Wilk test (alpha-error level 0.01). Kurtosis is mesokurtic at $k = 3$, leptokurtic or peaked with $k > 3$, and platykurtic or flat with $k < 3$ (87). Negative skewness suggests a left-tailed distribution with values concentrated on the right side of the score range, while a positive skewness suggests a right-tailed distribution with values concentrated on the left side of the continuum.

Table II. *Concept areas to capture psychological-personal factors (PPFs) in the context of the International Classification of Functioning, Disability and Health (ICF) framework and according to measurement instruments*

PPFs area	Measurement instrument	Abbreviation	Items	Time-frame	Subscales	Items per subscale	Scoring	Score interpretation
Feelings	Mental Health Index (58)	MHI-5	5	Past 4 weeks	–	–	Transformed sum score	0: low mood/high distress 100: high mood/low distress
	Positive And Negative Affect Schedule (60)	PANAS	20	Last week	Positive Affect (PA) Negative Affect (NA)	10	Sum score	10: less positive/less negative affect 50: more positive/more negative affect
	Hospital Anxiety and Depression Scale – Depression subscale (63)	HADS-D	7	Last week		7	Sum score	0: no depressed feelings 21: highly depressed feelings
Thoughts and Beliefs	Appraisal of Life Events Scale (ALE) (66)	ALE	16	Past 3 months	Challenge Loss Threat	6 4 6	Sum score	0: low degree of appraisal 30 (20): high degree of appraisal
	5 items from the World Health Organisation Quality of Life Scale (70, 71)	5 WHOQoL	5	Past 2 weeks	–	–	Mean score	1: dissatisfied with life 5: satisfied with life
Motives	Purpose in Life Test-Short Form (73)	PIL-SF	4	Now	–	–	Sum score	4: no purpose in life 28: strong purpose in life
Patterns of Experience and Behavior	General Self-Efficacy Scale (75)	GSES	10	In general	–	–	Sum score	10: low general self-efficacy 40: high general self-efficacy
	Big Five Inventory-21 (79)	BFI-21	21	In general	Openness Conscientiousness Extraversion Agreeableness Neuroticism	5 4 4 4 4	Mean score	1: low level of personality trait 5: high level of personality trait
	Social Skills Inventory – Short Form (80, 81)	SSI-SF	30	In general	Expressivity Sensitivity Control	10	Sum score	10: low level of social skill 50: high level of social skill
	Brief COPE (84)	COPE	28	In general	Self-distraction Active coping Denial Substance use Emotional support Instrumental support Behavioral disengagement Venting Positive reframing Planning Humor Acceptance Religion Self-blame	2	Sum score	2: coping strategy is not used 8: coping strategy is used a lot

The distributions were examined graphically by creating and comparing frequency graphs for the questionnaire scores by categorical population variables sex, type of lesion and cause of injury. For the continuous variables (age, age at injury, time since injury) scatterplots were created.

To explore differences between subgroups, differences in questionnaire scores were tested by sex, age, age at injury, time since injury, aetiology and severity of injury. For the continuous variables age, age at injury and time since injury the median split was used to create subgroups of approximately equal size. Time since injury and age at injury were combined as they are interdependent variables on the same dimension, time. Analyses of variance (ANOVA) were conducted to detect overall differences between the subgroups. To address multiple testing Bonferroni correction was applied. Since the same question-

naire data are tested for differences 7 times, namely for the 7 subgroup variables, we correct the alpha level 0.05/7 = 0.007. ANOVA effect size is regarded as small with an eta-square around 0.01, medium around 0.059 and large around 0.138 (88). Pearson coefficients for correlations between continuous variables age, age at injury and time since injury and questionnaire scores were reported. The contrasting subgroups were identified using confidence intervals.

The requirements for ANOVA were tested according to normality (Shapiro–Wilk test) and homoscedasticity (Levene's test, alpha=0.01) of the distributions. While ANOVA is robust against violations of normal distribution (89), heteroscedasticity was accounted for by using logarithmic transformation. If logarithmic transformation did not remedy heteroscedasticity, non-parametric procedures were used to examine subgroup differences. For dichotomous data the Mann-Whitney test is used, reporting z and *p*-value. For polytomous data the Kruskal–Wallis test is used, reporting χ^2, df and *p*.

To address missingness within the data-set, non-parametric missing value imputation using random forest was applied with the "missForest" package in R. In addition, systematic non-response bias in SwiSCI was accounted for by using inverse probability weighting based on propensity scores from multivariate logistic regression referring to the source population of $n = 3{,}144$ (for more details see (56)). Non-response in the SwiSCI study was explained by membership in the Swiss Paraplegic Association and time since injury. Non-response was not related to age, sex, type of lesion or language.

Analyses were conducted with STATA (90) and R (91). However, the STATA program used for calculating the propensity scores does not support non-parametric analyses for weighted data. Therefore, we report non-parametric analyses for unweighted data and use the Pearson correlation coefficient throughout.

RESULTS

Distribution of selected Psycohological Personal Factors in the SwiSCI population (Table III)

Feelings. With the exception of the positive affect subscale, the 4 measures used as indicators of feelings, mood and affect were not normally distributed in the present sample ($p < 0.01$). The MHI-5 and the PANAS-PA show negative left-skewed and platykurtic flat distributions. The MHI-5 had a median (Md) = 76 with an interquartile range (IQR) = 28 on a 0–100 scale, suggesting moderately high mood. PANAS-PA had a Md = 32 and IQR = 10 on a 10–50 scale, suggesting moderately strong positive affect in the past week.

The PANAS-NA and the HADS-D showed right-skewed and peaked distributions. Scores on the PANAS-NA (Md = 17, IQR = 8) and HADS-D (Md = 4, IQR=5) suggested little negative affect and depressed feelings in the sample overall in the past week. In both scales, a slight floor effect was detected. Mild depressive symptoms were reported by 13.1% of the sample, 6.8% reported experiencing moderate and 1.4% severe depressive symptoms.

Thoughts and Beliefs. The scores in the 4 scales used as indicators of the cognitive evaluation of the subjects' own situation were not normally distributed. The distribution of ALE-Challenge evaluations was not skewed, but flat, with a Md = 12 and IQR = 12 on a 0–30 scale and 9.7% of the sample scoring 0, suggesting overall that participants interpret their situation to a low to moderate degree in terms of being a challenge. The ALE subscales Loss (Md = 6, IQR = 8, scale 0–20) and Threat (Md = 8; IQR = 11, scale 0–30) were both platykurtic and right-skewed, showing considerable floor effects, with 12.9% and 11.1% of participants scoring 0, which indicates that they interpreted their situation to a low degree as loss or threat.

The distribution of the 5 WHOQoL items was skewed to the left and leptokurtic with a Md = 3.8 and IQR = 0.80 on a 1–5 scale, indicating that, on average, participants were satisfied with different domains of their lives.

Motives. A non-normal distribution of the PIL-SF scores was found in the present sample. The distribution was left-skewed and leptokurtic. The median sum score is 22 with an IQR = 7 on a scale with theoretical minimum of 4 and maximum of 28. This indicates that participants overall report having rather clear life goals, perceiving a strong purpose and meaning in life.

Patterns of Experience and Behavior. Only scores of 1 indicator of Patterns of Experience and Behavior was not normally distributed in the present sample ($p < 0.01$). The GSES scores were left-skewed and leptokurtic, with Md=30 and IQR = 6, indicating that overall participants experience a moderately strong general self-efficacy.

The subscales Conscientiousness, Extraversion and Agreeableness of the BFI-21 are normally distributed. The scores in BFI-21 subscales Openness (M = 3.75, SD = 0.69), Conscientiousness (M = 3.84, SD = 0.67), Extraversion (M = 3.44, SD = 0.76) and Agreeableness (M = 3.60, SD = 0.71) demonstrated that participants located themselves in the higher middle range of these personality characteristics. The distribution of the subscale Neuroticism (Md = 2.5, IQR = 1) was slightly skewed to the right, platykurtic with a considerable floor effect and 24.2% of the sample scoring at the minimum. This indicates overall that participants rather did not perceive themselves as nervous, tense or worried personalities.

All 3 subscales of the SSI-SF were normally distributed. On a scale of 10–50, participants showed a tendency to locate themselves in the middle range of the social skill characteristics Expressivity (M = 30.47, SD = 5.87), Sensitivity (M = 28.58, SD = 5.62) and Control (M = 33.48, SD = 5.46).

Among the 14 subscales of the COPE, 3 were found to be normally distributed on a scale ranging from 2 to 8: Self-distraction (M = 4.90, SD = 1.56), Positive reframing (M = 5.59, SD = 1.60) and Planning (M = 5.31, SD = 1.48). Overall, these strategies seem to be applied by the present sample with medium frequency. Active coping (Md = 6, IQR = 2) and Acceptance (Md = 6, IQR = 2) were 2 subscales with left-skewed distributions displaying strong ceiling effects. The maximum score of 8 was achieved by 20.1% of the participants in the use of Active coping and by 30.8% in the use of Acceptance. The subscales Emotional support (Md = 4, IQR = 2), Instrumental support (Md = 4, IQR = 1), Venting (Md = 4, IQR = 2), Humor (Md = 4, IQR = 2) and Self-blame (Md = 4, IQR = 3) were reported overall to be applied with low frequency. The distributions of these subscales are right-skewed and platykurtic and show considerable floor effects, i.e. the strategies were reported to be never used by 12.6% to 29.7% of the

Table III. *Distributions of the different psychological-personal factors (PPFs)*

PPFs Area	Measure	Subscale	Missing *n* (%)	Cronbach's α	Mean [CI]	Median	SD	25% Quartile	75% Quartile	Maximum *n* (%)	Minimum *n* (%)	Kurtosis	Skewness	*p*[a]
Feelings	MHI-5		40 (7.8)	0.86	72.4 [70.8–74.0]	76	18.1	60	88	14 (2.8)	0	2.82	–0.72	0.000
	PANAS	Positive affect	19 (3.7)	0.90	32.0 [31.4–32.7]	32	7.4	27	37	1 (0.2)	0	2.70	–0.20	0.028
	PANAS	Negative affect	17 (3.3)	0.86	18.0 [17.5–18.6]	17	6.3	13	21	0	38 (7.4)	3.99	1.02	0.000
	HADS-D		10 (2.0)	0.84	4.7 [4.3–5.0]	4	3.9	2	7	0	55 (10.7)	3.90	1.05	0.000
Thoughts	ALE	Challenge	35 (6.9)	0.87	12.0 [11.4–12.7]	12	7.4	6	18	0	49 (9.7)	2.02	–0.01	0.000
	ALE	Loss	32 (6.3)	0.83	6.8 [6.3–7.2]	6	5.1	3	11	6 (1.1)	66 (12.9)	2.43	0.49	0.000
	ALE	Threat	34 (6.7)	0.87	9.0 [8.4–9.6]	8	6.9	3	14	1 (0.2)	57 (11.1)	2.44	0.51	0.000
	5 WHOQoL		4 (0.8)	0.80	3.3 [3.3–3.4]	3.8	0.7	3.40	4.20	16 (3.2)	1 (0.2)	3.34	–0.63	0.000
Motives	PIL-SF		11 (2.2)	0.89	21.2 [20.8–21.6]	22	4.7	18	25	23 (4.5)	2 (0.3)	3.58	–0.90	0.000
Patterns of Experience and Behavior	GSES		13 (2.5)	0.91	30.3 [29.8–30.8]	30	5.6	28	34	18 (3.5)	1 (0.2)	3.54	–0.64	0.000
	BFI-21	Openness	9 (1.8)	0.70	3.8 [3.7–3.8]	3.8	0.7	3.20	4.20	28 (5.5)	0	3.09	–0.27	0.000
	BFI-21	Conscientiousness	9 (1.8)	0.63	3.8 [3.8–3.9]	3.75	0.6	3.50	4.25	31 (6.1)	0	3.03	–0.27	0.013
	BFI-21	Extraversion	9 (1.8)	0.70	3.4 [3.4–3.5]	3.5	0.8	3	4	15 (2.9)	2 (0.3)	2.94	–0.24	0.258
	BFI-21	Agreeableness	9 (1.8)	0.59	3.6 [3.5–3.7]	3.5	0.7	3	4	13 (2.6)	0	2.76	–0.19	0.044
	BFI-21	Neuroticism	10 (2.0)	0.76	2.5 [2.5–2.6]	2.5	0.9	2	3	1 (0.2)	21 (4.1)	2.50	0.20	0.001
	SSI-SF	Expressivity	16 (3.1)	0.72	30.5 [30.0–31.0]	30	5.9	26	34	1 (0.2)	0	3.23	0.11	0.625
	SSI-SF	Sensitivity	21 (4.1)	0.72	28.6 [28.1–29.1]	28	5.6	25	32	0	0	3.22	0.09	0.185
	SSI-SF	Control	17 (3.3)	0.69	33.5 [33.0–34.0]	34	5.5	30	37	0	0	3.50	–0.10	0.029
	COPE	Self-distraction	7 (1.4)	0.47	4.9 [4.8–5.0]	5	1.6	4	6	28 (5.4)	42 (8.3)	2.44	–0.01	1.000
	COPE	Active coping	6 (1.2)	0.71	6.0 [5.9–6.1]	6	1.5	5	7	103 (20.1)	9 (1.7)	2.61	–0.42	0.005
	COPE	Denial	9 (1.8)	0.55	3.3 [3.1–3.4]	3	1.5	2	4	8 (1.6)	229 (44.9)	3.72	1.14	0.000
	COPE	Substance use	7 (1.4)	0.92	2.6 [2.4–2.7]	2	1.2	2	3	7 (1.3)	380 (74.4)	9.19	2.45	0.000
	COPE	Emotional support	7 (1.4)	0.78	4.1 [3.9–4.2]	4	1.6	3	5	20 (3.9)	103 (20.2)	2.81	0.60	0.000
	COPE	Instrumental support	6 (1.2)	0.77	4.4 [4.3–4.5]	4	1.5	4	5	20 (4.0)	65 (12.6)	2.86	0.36	0.004
	COPE	Behavioral disengagement	8 (1.6)	0.42	3.1 [3.0–3.2]	3	1.3	2	4	4 (0.7)	249 (48.7)	3.74	1.09	0.000
	COPE	Venting	7 (1.4)	0.60	3.9 [3.8–4.0]	4	1.4	3	5	6 (1.1)	108 (21.1)	2.67	0.45	0.000
	COPE	Positive reframing	7 (1.4)	0.62	5.6 [5.5–5.7]	6	1.6	4	7	83 (16.3)	14 (2.8)	2.24	–0.13	0.298
	COPE	Planning	7 (1.4)	0.50	5.3 [5.2–5.4]	6	1.5	4	6	33 (6.4)	27 (5.3)	2.72	–0.32	0.076
	COPE	Humor	11 (2.2)	0.69	4.0 [3.9–4.2]	4	1.7	3	5	16 (3.2)	121 (23.8)	2.40	0.48	0.001
	COPE	Acceptance	12 (2.4)	0.71	6.4 [6.3–6.5]	6	1.5	6	8	157 (30.8)	6 (1.2)	3.03	–0.74	0.000
	COPE	Religion	12 (2.4)	0.89	3.7 [3.5–3.9]	3	2.0	2	5	38 (7.5)	221 (43.3)	2.59	0.91	0.000
	COPE	Self-blame	7 (1.4)	0.58	3.7 [3.6–3.8]	4	1.5	2	5	8 (1.6)	152 (29.7)	2.68	0.62	0.000

Missing refers to missing total scores. [a]*p*: *p*-value of the Shapiro–Wilk test for normal distribution. Cronbach's alpha and *p*-value of the Shapiro–Wilk test are based on unweighted data.

CI: 95% confidence interval; SD: standard deviation; MHI-5: Mental Health Index; PANAS: Positive And Negative Affect Schedule; HADS-D: Hospital Anxiety and Depression Scale – Depression subscale; ALE: Appraisal of Life Events Scale; 5 WHOQoL: 5 items from the World Health Organisation Quality of Life Scale; PIL-SF: Purpose in Life Test-Short Form; GSES: General Self-Efficacy Scale; BFI-21: Big Five Inventory-21; SSI-SF: Social Skills Inventory - Short Form; COPE: Brief COPE.

participants. The coping strategies Denial (Md = 3, IRQ = 2), Substance use (Md = 2, IRQ = 1), Behavioural disengagement (Md = 3, IRQ = 2) and Religion (Md = 3, IRQ = 3) were reported overall to be applied very seldom or not at all. The distribution of these subscales is right-skewed and peaked, except Religion, which is platykurtic. The minimum score of 2, i.e. no use of this strategy at all, is achieved by 43.3–74.4% of the participants.

Differences in Psycohological Personal Factors between SCI subgroups

Feelings. In the PPFs area of Feelings the analyses did not detect differences within the sample with regards to sex type of lesion or cause of injury (Table IV). The MHI-5 and the PANAS-NA did not vary systematically with any of the analysed population variables. The PANAS-PA, however, showed small, but statistically significant, differences regarding age, age at injury (AaI), time since injury (TsI) and in the combined AaI and TsI subgroups. Younger participants with SCI reported slightly more positive affect than older participants. Also, those participants with a younger AaI reported slightly more positive affect than those older at injury. Those who have been living longer with SCI reported slightly more positive affect than those with shorter TsI. The combined AaI and TsI groups differed in the experience of positive affect: participants who were older at injury and were injured more recently reported having less positive affect.

Considering the HADS-D scores, those older at injury and those with a shorter TsI reported slightly more depressed mood, which was also shown in the combined groups.

Thoughts and Beliefs. Considering the evaluation of difficult life situations as a challenge, medium size group differences were detected with respect to age, AaI, TsI and combined groups in the ALE-Challenge (Table IV). Younger participants, participants younger at injury, and those living longer with the injury appraised their situation more in terms of being a challenge. This is also shown in the combined groups, where those older at injury and shorter time since injury reported less challenge evaluations.

In the ALE-Loss subscale small, but significant, differences were found with regards to cause of injury. Participants with non-traumatic, rather than traumatic, SCI tended to make slightly more Loss appraisals.

The ALE subscale Threat did not show significant subgroup differences.

With regards to satisfaction with different life domains, small, but statistically significant, differences in the 5 WHO-QoL item scores were detected between the subgroups of AaI, TsI, the combined subgroups, and cause of injury. Those who were younger at injury and those with a longer TsI reported higher life satisfaction. Participants who were older at injury and experienced the injury more recently constitute the least satisfied group. Participants with a traumatic aetiology of injury reported higher life satisfaction than the other lesion groups.

Motives. For the PIL-SF small, but statistically significant, differences were found regarding AaI and the combined AaI

Table IV. *Subgroup differences in measurement scores in the areas Feelings, Thoughts and Beliefs, and Motives*

Population variable	Statistic	MHI-5	PANAS-PA	PANAS-NA	HADS-D	ALE Challenge	ALE Loss	ALE Threat	5 WHOQoL	PIL-SF
Sex										
Male	Mean [CI]	73.78 [71.96–75.59]	31.88 [31.15–32.62]	17.66 [17.06–18.26]	4.67 [4.27–5.07]	12.28 [11.52–13.04]	6.35 [5.86–6.84]	8.76 [8.09–9.42]	3.74 [3.67–3.81]	21.25 [20.76–21.73]
Female	Mean [CI]	69.12 [66.02–72.21]	32.42 [31.13–33.70]	18.88 [17.69–20.07]	4.68 [4.01–5.35]	11.44 [10.21–12.66]	7.82 [6.89–8.76]	9.71 [8.41–11.01]	3.73 [3.61–3.85]	21.14 [20.38–21.90]
	F, df, *p*	7.10, 1, 0.008	0.56, 1, 0.456	4.05, 1, 0.045	0.00, 1, 0.977	1.39,1, 0.239	6.59, 1, 0.011[a]	2.02, 1, 0.156	0.01, 1, 0.927	0.06, 1, 0.814
	η^2	0.014	0.001	0.008	0.000	0.003	0.015	0.004	0.000	0.000
Age										
Overall	r	0.03	**–0.14****	–0.11*	0.14**	**–0.27*****	–0.05	–0.07	–0.08	–0.11**
Younger	Mean [CI]	72.12 [69.85–74.38]	**33.06 [32.13–33.99]**	18.60 [17.78–19.41]	4.31 [3.85–4.78]	**13.71 [12.86–14.55]**	7.14 [6.54–7.74]	9.58 [8.73–10.43]	3.78 [3.70–3.87]	21.77 [21.24–22.31]
Older	Mean [CI]	72.70 [70.49–74.90]	**30.99 [30.13–31.86]**	17.43 [16.70–18.15]	5.05 [4.55–5.55]	**10.32 [9.39–11.24]**	6.42 [5.78–7.07]	8.48 [7.63–9.33]	3.69 [3.61–3.78]	20.64 [20.04–21.25]
	F, df, *p*	0.13, 1, 0.719	**10.25, 1, 0.002**	4.45, 1, 0.035	4.53, 1, 0.034	**4,43, 0.000**[b]	2.56, 1, 0.110	3.25, 1, 0.072	2.20, 1, 0.138	2.24, 0.025[b]
	η^2	0.000	**0.020**	0.009	0.009		0.005	0.006	0.004	
Age at injury										
Overall	r	–0.03	**–0.18*****	–0.03	**0.24*****	**–0.33*****	0.04	–0.01	**–0.18*****	**–0.19*****
Younger	Mean [CI]	74.17 [72.09–76.26]	**33.41 [32.54–34.29]**	17.85 [17.10–18.60]	**3.76 [3.35–4.16]**	**14.08 [13.23–14.94]**	6.48 [5.91–7.04]	9.02 [8.20–9.83]	**3.86 [3.77–3.94]**	**22.22 [21.74–22.71]**
Older	Mean [CI]	70.85 [68.51–73.19]	**30.84 [29.93–31.74]**	18.16 [17.37–18.96]	**5.48 [4.96–6.00]**	**10.23 [9.33–11.13]**	7.06 [6.39–7.73]	9.06 [8.17–9.94]	**3.63 [3.55–3.72]**	**20.33 [19.70–20.96]**
	F, df, *p*	1.92, 0.055[b]	**16.07, 1, 0.000**	0.31, 1, 0.576	**13.77, 1, 0.000a**	**36.96, 1, 0.000**	3.38, 1, 0.067[a]	0.00, 1, 0.949	**13.29, 1, 0.000**	**3.99, 0.000**[b]
	η^2		**0.030**	0.001	**0.030**	**0.068**	0.008	0.000	**0.025**	

Table IV. *Contd.*

Population variable	Statistic	MHI-5	PANAS-PA	PANAS-NA	HADS-D	ALE Challenge	ALE Loss	ALE Threat	5 WHOQoL	PIL-SF
Sex										
Time since injury										
Overall	r	0.08	**0.10***	–0.08	**–0.17*****	**0.14****	–0.12**	–0.07	**0.17*****	0.13**
Shorter	Mean [CI]	70.79 [68.40–73.17]	**31.19 [30.25–32.13]**	18.52 [17.74–19.31]	**5.35 [4.83–5.88]**	**11.01 [10.10–11.92]**	7.29 [6.64–7.95]	9.37 [8.50–10.24]	**3.63 [3.54–3.72]**	20.60 [19.95–21.24]
Longer	Mean [CI]	74.16 [72.12–76.20]	**32.97 [32.11–33.83]**	17.47 [16.71–18.22]	**3.94 [3.52–4.36]**	**13.14 [12.24–14.04]**	6.23 [5.65–6.81]	8.68 [7.84–9.51]	**3.86 [3.78–3.93]**	21.89 [21.41–22.37]
	F, df, *p*	–1.88, 0.060[b]	**7.54, 1, 0.006**	3.63, 1, 0.057	**9.35, 1, 0.002**[a]	**10.76, 1, 0.001**	7.13, 1, 0.008[a]	1.28, 1, 0.259	**13.82, 1, 0.000**	–2.46, 0.014[b]
	η^2		**0.015**	0.007	**0.020**	**0.021**	0.016	0.003	**0.026**	
Combined										
Younger shorter	Mean [CI]	74.93 [70.63–79.23]	**33.46 [31.69–35.24]**	19.07 [17.53–20.61]	**4.06 [3.16–4.96]**	**14.42 [12.66–16.19]**	6.42 [5.29–7.56]	8.87 [7.21–10.52]	**3.85 [3.67–4.03]**	**22.33 [21.24–23.41]**
Younger longer	Mean [CI]	73.90 [71.50–76.30]	**33.40 [32.38–34.42]**	17.40 [16.55–18.26]	**3.65 [3.20–4.10]**	**13.96 [12.97–14.95]**	6.49 [5.84–7.15]	9.07 [8.12–10.02]	**3.86 [3.77–3.95]**	**22.19 [21.65–22.72]**
Older shorter	Mean [CI]	69.48 [66.65–72.30]	**30.47 [29.38–31.55]**	18.35 [17.43–19.27]	**5.76 [5.14–6.38]**	**9.93 [8.91–10.95]**	7.57 [6.78–8.36]	9.53 [8.51–10.55]	**3.56 [3.46–3.66]**	**20.05 [19.29–20.81]**
Older longer	Mean [CI]	74.81 [70.85–78.77]	**31.90 [30.28–33.51]**	17.62 [16.02–19.22]	**4.66 [3.69–5.63]**	**11.09 [9.17–13.01]**	5.57 [4.36–6.79]	7.69 [5.94–9.44]	**3.85 [3.70–4.00]**	**21.14 [20.10–22.18]**
	F, df, *p*	6.85, 3, 0.077[b]	**6.03, 3, 0.001**	1.44, 3, 0.231	**5.31, 3, 0.001**[a]	**12.83, 3, 0.000**	3.14, 3, 0.025[a]	1.24, 3, 0.295	**7.61, 3, 0.000**	**18.09, 3, 0.000b**
	η^2		**0.034**	0.008	**0.034**	**0.071**	0.021	0.007	**0.043**	
Type of lesion										
Complete paraplegia	Mean [CI]	73.92 [71.28–76.56]	33.13 [32.00–34.26]	17.78 [16.77–18.78]	3.99 [3.45–4.52]	13.10 [11.90–14.30]	6.19 [5.43–6.96]	8.39 [7.33–9.46]	3.88 [3.77–3.99]	21.82 [21.02–22.44]
Complete tetraplegia	Mean [CI]	74.11 [69.71–78.51]	31.23 [29.28–33.19]	17.44 [15.86–19.03]	4.43 [3.35–5.51]	11.82 [10.23–13.40]	7.03 [5.81–8.24]	10.25 [8.42–12.07]	3.64 [3.45–3.82]	21.17 [19.91–22.43]
Incomplete paraplegia	Mean [CI]	70.95 [68.20–73.70]	31.91 [30.88–32.94]	18.35 [17.43–19.27]	4.91 [4.33–5.50]	11.37 [10.32–12.43]	7.18 [6.40–7.96]	9.25 [8.22–10.29]	3.69 [3.59–3.79]	21.06 [20.35–21.78]
Incomplete tetraplegia	Mean [CI]	72.19 [68.60–75.79]	31.16 [29.65–32.66]	18.00 [16.84–19.17]	5.30 [4.50–6.11]	11.88 [10.41–13.35]	6.76 [5.82–7.69]	8.96 [7.69–10.23]	3.68 [3.55–3.82]	20.68 [19.70–21.66]
	F, df, *p*	0.94, 3, 0.423	1.86, 3, 0.136	0.40, 3, 0.752	2.80, 3, 0.0400	1.60, 3, 0.188	1.13, 3, 0.338	1.03, 3, 0.381	3.08, 3, 0.027	1.38, 3, 0.247
	η^2	0.006	0.011	0.002	0.016	0.009	0.007	0.006	0.018	0.008
Cause of injury										
Traumatic	Mean [CI]	72.75 [70.98–74.52]	32.37 [31.65–33.09]	17.70 [17.11–18.29]	4.47 [4.09–4.85]	12.38 [11.67–13.08]	**6.45 [5.98–6.92]**	8.81 [8.14–9.48]	**3.80 [3.73–3.87]**	21.53 [21.10–21.97]
Non-traumatic	Mean [CI]	71.25 [67.75–74.74]	30.96 [29.55–32.37]	19.06 [17.73–20.39]	5.35 [4.59–6.11]	10.90 [9.40–12.39]	**7.89 [6.80–8.98]**	9.79 [8.43–11.14]	**3.53 [3.40–3.65]**	20.16 [19.17–21.16]
	F, df, *p*	0.63, 1, 0.428	3.33, 1, 0.069	4.31, 1, 0.039	4.60, 1, 0.033	3.65, 1, 0.057	**9.12, 1, 0.003**[a]	1.81, 1, 0.179	**14.73, 1, 0.000**	2.59, 0.010[b]
	η^2	0.001	0.006	0.008	0.009	0.007	**0.020**	0.004	**0.028**	

*$p<0.05$; **$p<0.01$; ***$p<0.001$. [a]F-test based on log-transformed data. [b]Non-parametric testing based on unweighted data. Bonferroni corrected alpha level for F-test: $p<0.007$ (bold).

CI: 95% confidence interval of the mean value; F: test value; df: degrees of freedom; *p*: probability value; η^2: eta squared effect size; r: Pearson correlation coefficient; MHI-5: Mental Health Index; PANAS-PA: Positive And Negative Affect Schedule – Positive Affect; PANAS-NA: Positive And Negative Affect Schedule – Negative Affect; HADS-D: Hospital Anxiety and Depression Scale – Depression subscale; ALE: Appraisal of Life Events Scale – Challenge; ALE Loss: Appraisal of Life Events Scale; 5 WHOQoL: 5 items from the World Health Organisation Quality of Life Scale; PIL-SF: Purpose in Life Test-Short Form.

and TsI subgroups (Table IV). Participants who were younger at injury report stronger purpose and meaning in life than those older at injury. The combined subgroup of participants who were older at injury, and whose injury happened more recently, reported significantly lower purpose in life than the other subgroups.

Patterns of Experience and Behavior. General self-efficacy measured by the GSES did not differ with regards to sex, age, TsI, combined AaI and TsI subgroups, type of lesion or cause of injury (Table V). A small, but statistically significant, difference was detected regarding AaI. Participants who were younger at injury reported a stronger general self-efficacy than those who were older at injury.

The "big five" personality traits measured by the BFI-21 differed across some examined subgroups. Women scored higher on Conscientiousness, Agreeableness and Neuroticism than males. Conscientiousness was found to be higher in younger age, younger AaI and in the combined younger AaI and longer TsI subgroup.

The indicators of social skills measured by the SSI subscales Expressivity, Sensitivity and Control were found to differ by sex, age, AaI, TsI and the combined subgroups. Younger persons with SCI, those who were younger at injury, and those who were younger and more recently injured reported slightly higher expressivity than the comparison groups. With respect to social Sensitivity, a sex difference was detected with women scoring higher than men. The Control skill was more pronounced in those participants who were younger at injury and with shorter time since injury. Participants who were older at injury and with shorter time since injury reported overall slightly less SSI-Control than the other subgroups.

Among the COPE subscales (Table VI), subgroup differences were not detected for Active coping, Substance use, Behavioral disengagement, Planning, Religion and Self-blame. None of the COPE subscales differed by cause of injury. Self-distraction was used more frequently as a coping strategy by women and those who were more recently injured. Older participants and those who were older at injury reported more frequent use of Denial. Females scored higher in the COPE subscales Emotional support, Instrumental support, and Venting. Younger participants also scored higher in Instrumental support and Venting. Positive reframing was used more frequently by those with longer TsI and with complete paraplegia. The use of Humor as a coping strategy differed with regards to age, AaI as well as the combination of AaI and TsI. Younger persons, persons younger at injury reported more regular use of Humor. Participants who were older at injury and with shorter time since injury scored lowest on the use of Humor and Acceptance as regular coping strategies.

DISCUSSION

In the present study, functioning and health of individuals with SCI is described in the light of PPFs. The PPF areas of Feelings, Thoughts, Motives, and Patterns of Experience and Behavior were assessed using a set of measurement instruments

Table V. *Subgroup differences in General Self-Efficacy Scale (GSES), Big Five Inventory-21 (BFI-21), and Social Skills Inventory – Short form (SSI-SF) scores in the area Patterns of Experience and Behavior*

Population variable	Statistic	GSES	BFI-21 Openness	BFI-21 Conscientiousness	BFI-21 Extraversion	BFI-21 Agreeableness	BFI-21 Neuroticism	SSI-SF Expressivity	SSI-SF Sensitivity	SSI-SF Control
Sex										
Male	Mean [CI]	30.43 [29.87–30.99]	3.70 [3.63–3.77]	**3.79 [3.72–3.86]**	3.40 [3.33–3.47]	**3.54 [3.47–3.60]**	**2.45 [2.36–2.53]**	30.52 [29.94–31.10]	**28.03 [27.46–28.61]**	33.81 [33.30–34.32]
Female	Mean [CI]	30.01 [29.02–30.99]	3.87 [3.76–3.98]	**3.97 [3.86–4.07]**	3.54 [3.40–3.68]	**3.74 [3.61–3.87]**	**2.72 [2.57–2.87]**	30.37 [29.31–31.42]	**29.88 [28.97–30.80]**	32.68 [31.62–33.74]
	F, df, *p*	0.61, 1, 0.436	6.47, 1, 0.011	**8.37, 1, 0.004**	3.75, 1, 0.053	**8.62,1, 0.004**	**11.50, 1, 0.001**	0.07,1, 0.729	**11.73,1, 0.001**	1.75, 0.081[a]
	η^2	0.001	0.013	**0.016**	0.007	**0.017**	**0.022**	0.000	**0.023**	
Age										
Overall	r	–0.10*	0.01	**–0.12****	–0.11*	0.09*	0.04	**–0.15*****	–0.12**	–0.10*
Younger	Mean [CI]	30.88 [30.23–31.53]	3.78 [3.69–3.87]	**3.93 [3.85–4.00]**	3.52 [3.42–3.62]	3.57 [3.48–3.66]	2.48 [2.37–2.59]	**31.29 [30.58–32.00]**	29.16 [28.45–29.87]	34.00 [33.30–34.70]
Older	Mean [CI]	29.71 [28.99–30.43]	3.72 [3.64–3.80]	**3.76 [3.68–3.84]**	3.36 [3.27–3.45]	3.62 [3.54–3.70]	2.58 [2.48–2.67]	**29.63 [28.91–30.36]**	27.99 [27.32–28.66]	32.94 [32.30–33.58]
	F, df, *p*	5.60, 1, 0.018	1.04, 1, 0.309	**8.83, 1, 0.003**	5.89, 1, 0.016	0.67, 1, 0.414	1.63, 1, 0.202	**10.37, 1, 0.001**	5.57, 1, 0.019	4.86, 1, 0.028
	η^2	0.011	0.002	**0.017**	0.011	0.001	0.003	**0.020**	0.011	0.009
Age at injury										
Overall	r	**–0.12****	–0.01	**–0.16*****	–0.09	0.03	0.08	**–0.16*****	–0.10*	**–0.16*****
Younger	Mean [CI]	**31.13 [30.51–31.75]**	3.76 [3.67–3.85]	**3.94 [3.86–4.01]**	3.52 [3.43–3.62]	3.60 [3.51–3.69]	2.44 [2.33–2.54]	**31.63 [30.91–32.35]**	28.98 [28.31–29.65]	**34.51 [33.84–35.19]**
Older	Mean [CI]	**29.58 [28.84–30.31]**	3.74 [3.66–3.83]	**3.76 [3.68–3.84]**	3.37 [3.28–3.46]	3.59 [3.51–3.68]	2.61 [2.50–2.71]	**29.45 [28.75–30.16]**	28.23 [27.52–28.94]	**32.57 [31.91–33.22]**
	F, df, *p*	**2.76, 0.006[a]**	0.08, 1, 0.773	**9.70, 1, 0.002**	5.21, 1, 0.023	0.01, 1, 0.913	5.20, 1, 0.023	**18.11, 1, 0.000**	2.24, 1, 0.135	**16.60, 1, 0.000**
	η^2		0.000	**0.019**	0.010	0.000	0.010	**0.034**	0.004	**0.032**

Table V. *Contd.*

Population variable	Statistic	GSES	BFI-21 Openness	BFI-21 Conscientiousness	BFI-21 Extraversion	BFI-21 Agreeableness	BFI-21 Neuroticism	SSI-SF Expressivity	SSI-SF Sensitivity	SSI-SF Control
Time since injury										
Overall	r	0.05	0.02	0.09*	–0.01	0.08	–0.07	0.02	–0.01	**0.11***
Shorter	Mean [CI]	29.82 [29.10–30.55]	3.72 [3.63–3.80]	3.80 [3.72–3.88]	3.42 [3.33–3.52]	3.56 [3.47–3.65]	2.62 [2.51–2.73]	30.19 [29.47–30.90]	28.59 [27.89–29.28]	**32.79 [32.13–33.45]**
Longer	Mean [CI]	30.83 [30.19–31.47]	3.79 [3.71–3.88]	3.89 [3.82–3.97]	3.46 [3.37–3.55]	3.63 [3.55–3.72]	2.42 [2.33–2.52]	30.78 [30.05–31.52]	28.57 [27.88–29.26]	**34.23 [33.55–34.90]**
	F, df, *p*	4.13, 1, 0.043	1.55, 1, 0.214	3.07, 1, 0.080	0.36, 1, 0.551	1.16, 1, 0.283	7.05, 1, 0.008	1.32, 1, 0.252	0.00, 1, 0.969	**8.95, 1, 0.003**
	η^2	0.008	0.003	0.006	0.001	0.002	0.014	0.003	0.000	**0.017**
Combined										
Younger shorter	Mean [CI]	31.22 [30.02–32.42]	3.66 [3.48–3.84]	**3.84 [3.68–4.01]**	3.54 [3.32–3.76]	3.44 [3.25–3.63]	2.52 [2.29–2.75]	**32.85 [31.43–34.27]**	28.90 [27.72–30.09]	**34.51 [33.41–35.61]**
Younger longer	Mean [CI]	31.10 [30.37–31.82]	3.80 [3.70–3.90]	**3.97 [3.88–4.06]**	3.52 [3.41–3.62]	3.66 [3.56–3.76]	2.40 [2.29–2.52]	**31.19 [30.35–32.02]**	29.00 [28.19–29.81]	**34.51 [33.69–35.34]**
Older shorter	Mean [CI]	29.38 [28.50–30.25]	3.73 [3.64–3.83]	**3.78 [3.69–3.87]**	3.38 [3.28–3.49]	3.60 ¨3.50–3.70[	2.65 [2.53–2.78]	**29.34 [28.55–30.14]**	28.49 [27.65–29.33]	**32.24 [31.46–33.03]**
Older longer	Mean [CI]	30.15 [28.80–31.50]	3.77 [3.60–3.94]	**3.70 [3.55–3.85]**	3.32 [3.15–3.50]	3.57 [3.40–3.73]	2.47 [2.28–2.66]	**29.77 [28.25–31.29]**	27.49 [26.16–28.81]	**33.51 [32.35–34.67]**
	F, df, *p*	3.65, 3, 0.013	0.72, 3, 0.541	**4.13, 3, 0.007**	1.85, 3, 0.137	1.47, 3, 0.223	2.85, 3, 0.037	**7.45, 3, 0.000**	1.31, 3, 0.272	**6.50, 3, 0.000**
	η^2	0.021	0.004	**0.024**	0.011	0.009	0.017	**0.042**	0.008	**0.037**
Type of lesion										
Complete Paraplegia	Mean [CI]	30.86 [30.02–31.71]	3.69 [3.59–3.80]	3.86 [3.76–3.95]	3.51 [3.40–3.63]	3.58 [3.47–3.69]	2.45 [2.32–2.58]	31.19 [30.26–32.11]	28.18 [27.43–28.93]	34.32 [33.51–35.12]
Complete tetraplegia	Mean [CI]	29.30 [27.80–30.81]	3.77 [3.59–3.95]	3.78 [3.62–3.94]	3.42 [3.23–3.60]	3.69 [3.52–3.87]	2.52 [2.29–2.74]	31.09 [29.55–32.63]	29.17 [27.64–30.70]	34.20 [33.03–30.70]
Incomplete paraplegia	Mean [CI]	30.24 [29.47–31.01]	3.80 [3.70–3.89]	3.89 [3.80–3.98]	3.37 [3.25–3.48]	3.63 [3.53–3.73]	2.56 [2.43–2.68]	29.97 [29.09–30.86]	28.61 [27.76–29.46]	32.78 [31.94–33.62]
Incomplete tetraplegia	Mean [CI]	30.12 [28.92–31.32]	3.74 [3.60–3.88]	3.76 [3.64–3.89]	3.49 [3.34–3.64]	3.51 [3.37–3.64]	2.58 [2.42–2.75]	30.12 [29.11–31.13]	28.80 [27.61–29.99]	33.27 [32.21–34.33]
	F, df, *p*	1.10, 3, 0.349	0.65, 3, 0.580	1.13, 3, 0.337	1.29, 3, 0.277	1.10, 3, 0.350	0.66, 3, 0.578	1.55, 3, 0.201	0.49, 3, 0.686	2.65, 3, 0.049
	η^2	0.006	0.004	0.007	0.008	0.006	0.004	0.009	0.003	0.015
Cause of injury										
Traumatic	Mean [CI]	30.42 [29.89–30.96]	3.73 [3.66–3.80]	3.86 [3.79–3.92]	3.45 [3.38–3.52]	3.57 [3.51–3.64]	2.48 [2.40–2.56]	30.50 [29.95–31.04]	28.29 [27.74–28.84]	33.70 [33.19–34.21]
Non-traumatic	Mean [CI]	29.91 [28.77–31.06]	3.82 [3.69–3.95]	3.80 [3.67–3.93]	3.41 [3.25–3.58]	3.66 [3.52–3.81]	2.69 [2.52–2.87]	30.40 [29.10–31.69]	29.53 [28.47–30.59]	32.74 [31.59–33.90]
	F, df, *p*	0.76, 1, 0.384	1.49, 1, 0.222	0.64, 1, 0.423	0.21, 1, 0.644	1.46, 1, 0.228	5.88, 1, 0.016	0.03, 1, 0.872	4.41, 1, 0.036	2.80, 1, 0.095
	η^2	0.001	0.003	0.001	0.000	0.003	0.011	0.000	0.009	0.005

*$p<0.05$; **$p<0.01$; ***$p<0.001$. [a]Non-parametric testing based on unweighted data. Bonferroni corrected alpha level for F-test: $p<0.007$ (bold).

CI: 95% confidence interval of the mean value; F: test value; df: degrees of freedom; *p*: probability value; η^2: eta-squared effect size; r: Pearson correlation coefficient.

Table VI. *Subgroup differences in Brief COPE scores in the area Patterns of Experience and Behavior*

	Statistic	Self -distraction	Active coping	Denial	Substance use	Emotional support	Instrumental support	Behavioral disengagement	Venting	Positive reframing	Planning	Humor	Acceptance	Religion	Self-blame
Sex															
Male	Mean [CI]	4.76	5.94	3.28	2.60	**3.80**	**4.17**	3.06 [2.93–3.19]	**3.76**	5.62	5.24	4.09	6.45	3.63	3.62
		[4.60–4.92]	[5.79–6.10]	[3.14–3.43]	[2.48–2.72]	**(3.65–3.95)**	**[4.03–4.32]**		**[3.62–3.90]**	[5.46–5.78]	[5.09–5.40]	[3.93–4.25]	[6.30–6.60]	[3.44–3.83]	[3.48–3.77]
Female	Mean [CI]	5.22	6.09	3.15	2.51	**4.68**	**4.89**	3.09 [2.88–3.30]	**4.18**	5.54	5.47	3.90	6.33	3.89	3.81
		[4.97–5.48]	[5.84–6.33]	[2.90–3.41]	[2.31–2.72]	**[4.40–4.97]**	**[4.64–5.13]**		**[3.93–4.44]**	[5.25–5.82]	[5.22–5.71]	[3.59–4.20]	[6.09–6.56]	[3.53–4.24]	[3.52–4.09]
	F, df, *p*	9.43, 1,	0.99, 1,	0.86, 1,	0.60, 1,	**32.39, 1,**	**25.67, 1,**	0.06, 1, 0.808	**9.50, 1,**	0.27, 1,	2.41, 1,	1.47, 1,	0.73, 1,	1.76, 1,	0.47, 1,
		0.002	0.320	0.356	0.440	**0.000**[a]	**0.000**		**0.002**	0.604	0.121	0.226	0.393	0.185	0.495[a]
	η^2	0.018	0.002	0.002	0.001	**0.060**	**0.048**	0.000	**0.018**	0.001	0.005	0.003	0.001	0.003	0.001
Age															
Overall	r	0.03	–0.07	0.12**	–0.08	–0.12**	**–0.09***	0.07	**–0.18*****	–0.05	–0.07	**–0.22*****	–0.07	0.12**	–0.05
Younger	Mean [CI]	4.83	6.06	3.04	2.63	4.24	**4.56**	2.97 [2.82–3.12]	**4.15**	5.68	5.41	**4.39**	6.55	3.59	3.71
		[4.64–5.02]	[5.88–6.24]	[2.88–3.20]	[2.48–2.78]	[4.05–4.44]	**[4.38–4.75]**		**[3.97–4.33]**	[5.48–5.88]	[5.24–5.59]	**[4.18–4.59]**	[6.38–6.72]	[3.35.3.83]	[3.52–3.89]
Older	Mean [CI]	4.97	5.91	3.45	2.52	3.87	**4.20**	3.17 [3.00–3.33]	**3.61**	5.51	5.20	**3.67**	6.27	3.83	3.65
		[4.77–5.16]	[5.72–6.10]	[3.26–3.65]	[2.38–2.66]	[3.68–4.06]	**[4.02–4.38]**		**[3.44–3.78]**	[5.31–5.70]	[5.02–5.39]	**[3.48–3.87]**	[6.08–6.46]	[3.58–4.07]	[3.46–3.84]
	F, df, *p*	1.01, 1,	1.37, 1,	8.31, 1,	1.16, 1,	7.26, 1,	**7.51, 1, 0.006**	2.94, 1, 0.087	**18.82, 1,**	1.50, 1,	2.53, 1,	**24.86, 1,**	4.74, 1,	1.81, 1,	0.19, 0.662
		0.316	0.243	0.004[a]	0.283	0.007			**0.000**	0.221	0.113	**0.000**	0.030	0.179	
	η^2	0.002	0.003	0.016	0.002	0.014	**0.015**	0.006	**0.036**	0.003	0.005	**0.047**	0.009	0.004	0.000
Age at injury															
Overall	r	0.08	–0.07	**0.16*****	–0.06	–0.07	–0.05	0.07	–0.09*	–0.12**	–0.09*	**–0.21*****	–0.11**	0.11**	–0.02
Younger	Mean [CI]	4.75	6.05	**3.01**	2.67	4.12	4.44	3.01 [2.87–3.16]	3.97	5.79	5.37	**4.36**	6.57	3.57	3.68
		[4.56–4.93]	[5.88–6.21]	**[2.86–3.17]**	[2.51–2.83]	[3.92–4.31]	[4.26–4.62]		[3.78–4.15]	[5.61–5.97]	[5.20–5.54]	**[4.15–4.56]**	[6.40–6.74]	[3.33–3.81]	[3.50–3.86]
Older	Mean [CI]	5.03	5.93	**3.45**	2.49	4.01	4.33	3.11 [2.95–3.28]	3.81	5.42	5.25	**3.75**	6.27	3.83	3.68
		[4.83–5.23]	[5.74–6.13]	**[3.25–3.64]**	[2.36–2.63]	[3.81–4.20]	[4.15–4.52]		[3.64–3.98]	[5.22–5.63]	[5.06–5.45]	**[3.55–3.95]**	[6.09–6.46]	[3.59–4.07]	[3.49–3.86]
	F, df, *p*	4.35, 1,	0.57, 0.57[b]	**–3.01,**	1.81, 0.071[b]	0.60, 1,	0.66, 1, 0.418	0.75, 1, 0.386	1.55, 1,	2.24, 0.025[b]	0.84, 1,	**17,35, 1,**	5.42,1,	2.25, 1,	0.00, 1,
		0.038		**0.003**[b]		0.439			0.214		0.360	**0.000**	0.020	0.134	0.981
	η^2	0.008				0.001	0.001	0.001	0.003		0.002	**0.033**	0.011	0.004	0.000
Time since injury															
Overall	r	**–0.08**	0.01	–0.09	0.00	–0.03	–0.04	–0.01	–0.09*	**0.11***	0.03	0.03	0.08	–0.01	–0.03
Shorter	Mean [CI]	**5.08**	6.03	3.39	2.56	4.10	4.44	3.06 [2.90–3.22]	4.02	**5.38**	5.28	3.91	6.26	3.73	3.72
		[4.89–5.27]	[5.84–6.21]	[3.20–3.58]	[2.42–2.70]	[3.90–4.30]	[4.26–4.62]		[3.84–4.20]	**[5.17–5.58]**	[5.10–5.46]	[3.70–4.11]	[6.07–6.45]	[3.49–3.97]	[3.52–3.92]
Longer	Mean [CI]	**4.70**	5.94	3.08	2.59	4.01	4.33	3.08 [2.92–3.24]	3.74	**5.83**	5.34	4.17	6.58	3.68	3.64
		[4.51–4.89]	[5.76–6.13]	[2.91–3.25]	[2.44–2.74]	[3.82–4.21]	[4.14–4.51]		[3.57–3.91]	**[5.65–6.01]**	[5.16–5.52]	[3.97–4.38]	[6.41–6.75]	[3.44–3.93]	[3.46–3.81]
	F, df, *p*	**7.82, 1,**	0.38, 1,	5.78, 1,	0.06, 1,	0.37, 1,	0.74, 1, 0.389	0.04, 1, 0.844	4.82, 1,	**10.41,**	0.19.1,	3.31, 1,	6.35, 1,	0.07, 1,	0.41, 1,
		0.005	0.537	0.017	0.806	0.541			0.029	**1,0.001**	0.660	0.069	0.012	0.794	0.523
	η^2	**0.015**	0.001	0.011	0.000	0.001	0.001	0.000	0.009	**0.020**	0.000	0.006	0.012	0.000	0.001
Combined															
Younger shorter	Mean [CI]	4.87	6.14	3.10	2.70	4.36	4.41	2.93 [2.62–3.25]	4.27	5.58	5.39	**4.64**	**6.67**	3.42	3.91
		[4.49–5.25]	[5.81–6.47]	[2.78–3,42]	[2.39–3.01]	[3.92–4.80]	[4.05–4.76]		[3.85–4.70]	[5.19–5.98]	[5.07–5.72]	**[4.20–5.07]**	**[6.35–6.99]**	[2.97–3.87]	[3.47–4.36]
Younger longer	Mean [CI]	4.70	6.01	2.98	2.66	4.03	4.45	3.04 [2.87–3.21]	3.86	5.86	5.37	**4.25**	**6.53**	3.62	3.60
		[4.49–4.91]	[5.82–6.21]	[2.80–3.16]	[2.48–2.85]	[3.81–4.24]	[4.24–4.67]		[3.66–4.06]	[5.66–6.06]	[5.17–5.57]	**[4.03–4.48]**	**[6.34–6.73]**	[3.33–3.91]	[3.40–3.79]
Older shorter	Mean [CI]	5.15	5.99	3.49	2.52	4.02	4.45	3.09 [2.91–3.28]	3.94	5.31	5.25	**3.68**	**6.13**	3.83	3.66
		[4.93–5.37]	[5.77–6.21]	[3.26–3.71]	[2.36–2.68]	[3.79–4.24]	[4.24–4.66]		[3.74–4.13]	[5.07–5.56]	[5.03–5.46]	**[3.45–3.90]**	**[5.91–6.35]**	[3.54–4.11]	[3.44–3.88]
Older longer	Mean [CI]	4.70	5.78	3.34	2.40	3.98	4.00	3.17 [2.80–3.53]	3.45	5.75	5.27	**3.97**	**6.69**	3.84	3.73
		[4.26–5.13]	[5.33–6.22]	[2.95–3.73]	[2.15–2.66]	[3.55–4.40]	[3.62–4.39]		[3.13–3.76]	[5.34–6.16]	[4.85–5.70]	**[3.55–4.40]**	**[6.38–7.00]**	[3.37–4.31]	[3.37–4.10]
	F, df, *p*	3.12,3,	0.74, 3,	3.59, 3,	1.16, 3,	0.88, 3,	1.81, 3, 0.145	0.42, 3, 0.742	3.92, 3,	9.08, 3,	0.29, 3,	**7.25, 3,**	**4.63, 3,**	0.91, 3,	0.74, 3,
		0.026	0.864[b]	0.014[a]	0.323	0.452			0.009	0.028[b]	0.833	**0.000**	**0.003**	0.437	0.531
	η^2	0.018		0.021	0.007	0.005	0.011	0.002	0.023		0.002	**0.041**	**0.027**	0.005	0.004

Table VI. *Contd.*

	Statistic	Self -distraction	Active coping	Denial	Substance use	Emotional support	Instrumental support	Behavioral disengagement	Venting	Positive reframing	Planning	Humor	Acceptance	Religion	Self-blame
Type of lesion															
Complete paraplegia	Mean [CI]	4.79 [4.54–5.04]	6.15 [5.92–6.37]	3.13 [2.92–3.34]	2.55 [2.36–2.73]	4.15 [3.90–4.39]	4.41 [4.19–4.64]	3.01 [2.82–3.21]	3.85 [3.65 [4.06]	**5.98 [5.76–6.21]**	5.48 [5.26–5.69]	4.49 [4.21–4.76]	6.59 [6.38–6.80]	3.45 [3.15–3.74]	3.55 [3.32–3.77]
Complete tetraplegia	Mean [CI]	5.04 [4.67–5.42]	5.61 [5.20–6.03]	2.83 [2.50–3.15]	2.66 [2.37–2.96]	3.90 [3.52–4.27]	4.05 [3.72–4.38]	2.96 [2.65–3.28]	4.17 [3.75–4.59]	**5.42 [5.03–5.81]**	5.43 [5.06–5.80]	3.91 [3.50–4.32]	6.53 [6.16–6.91]	3.53 [3.00–4.06]	3.76 [3.40–4.11]
Incomplete para	Mean [CI]	4.94 [4.72–5.17]	5.98 [5.77–6.18]	3.38 [3.16–3.60]	2.60 [2.41–2.78]	3.99 [3.76–4.22]	4.31 [4.09–4.52]	3.10 [2.90–3.30]	3.80 [3.59–4.00]	**5.44 [5.20–5.68]**	5.18 [4.97–5.39]	3.81 [3.59–4.03]	6.26 [6.03–6.48]	4.00 [3.70–4.29]	3.75 [3.52–3.98]
Incomplete tetra	Mean [CI]	4.90 [4.58–5.21]	5.96 [5.64–6.28]	3.35 [3.05–3.65]	2.53 [2.33–2.74]	4.14 [3.81–4.46]	4.64 [4.34–4.95]	3.13 [2.89–3.37]	3.96 [3.68–4.24]	**5.42 [5.09–5.75]**	5.27 [4.95–5.59]	3.88 [3.56–4.20]	6.40 [6.13–6.67]	3.61 [3.26–3.97]	3.70 [3.40–3.99]
	F, df, *p*	0.45, 3, 0.721	1.67, 3, 0.172	2.47, 3, 0.061	0.19, 3, 0.905	0.53, 3, 0.660	2.18, 3, 0.090	0.33, 3, 0.806	1.05, 3, 0.368	**4.27, 3, 0.005**	1.31, 3, 0.269	5.50, 3, 0.001	1.68, 3, 0.171	2.58, 3, 0.053	0.58, 3, 0.628
	η^2	0.003	0.010	0.014	0.001	0.003	0.013	0.002	0.006	**0.025**	0.008	0.032	0.010	0.015	0.003
Cause of injury															
Traumatic	Mean [CI]	4.84 [4.69–4.98]	6.02 [5.87–6.16]	3.16 [3.02–3.30]	2.55 [2.44–2.66]	3.96 [3.80–4.11]	4.31 [4.16–4.45]	2.99 [2.86–3.11]	3.81 [3.67–3.95]	5.61 [5.46–5.77]	5.31 [5.16–5.45]	4.12 [3.96–4.28]	6.50 [6.36–6.63]	3.71 [3.51–3.90]	3.73 [3.59–3.88]
Non-traumatic	Mean [CI]	5.11 [4.79–5.43]	5.89 [5.62–6.17]	3.51 [3.21–3.81]	2.67 [2.41–2.93]	4.40 [4.07–4.73]	4.64 [4.35–4.93]	3.34 [3.08–3.59]	4.12 [3.85–4.38]	5.53 [5.21–5.85]	5.32 [5.06–5.59]	3.75 [3.43–4.06]	6.14 [5.84–6.44]	3.71 [3.33–4.08]	3.51 [3.20–3.81]
	F, df, *p*	2.74, 1, 0.098	0.60, 1, 0.440	5.21, 1, 0.023	0.93, 1, 0.335	7.16, 1, 0.008	4.53, 1, 0.034	6.86, 1, 0.009	4.09, 1, 0.044	0.26, 1, 0.613	0.02, 1, 0.900	4.73, 1, 0.030	5.69, 1, 0.018	0.00, 1, 0.996	2.01, 1, 0.156
	η^2	0.005	0.001	0.010	0.002	0.014	0.009	0.0113	0.008	0.001	0.000	0.009	0.011	0.000	0.004

*$p<0.05$; **$p<0.01$; ***$p<0.001$. [a]F-test based on log-transformed data. [b]Non-parametric testing based on unweighted data.

CI: 95% confidence interval of the mean value; F: test value; df: degrees of freedom; *p*: probability value; η^2: eta squared effect size; r: Pearson correlation coefficient. Bonferroni corrected alpha level for F-test: $p<0.007$ (bold).

selected according to a predefined rationale in line with the ICF (53).

The results show that most individuals in the present SwiSCI sample experienced little negative affect and depressed feelings, but moderately strong positive affect in the week before the data collection. The majority of participants did not evaluate difficult life situations as loss or threat, but to some degree as a positive challenge. Participants were rather satisfied with life and experienced a strong sense of purpose in life. They reported moderately strong self-efficacy, scored low on the personality trait of neuroticism and in the middle range of social skills. They used problem-oriented coping strategies (15) (e.g. active coping, positive reframing, planning) with moderate to high frequency and less frequently adopt dysfunctional avoidance-oriented coping (e.g. substance use or behavioural disengagement) (22).

The analyses show that statistically significant differences between age at injury and time since injury subgroups can be detected across different PPF areas. Participants who were older (> 32 years) and sustained their injury more recently (< 14 years) experienced more depressed mood, less positive affect and challenge appraisals, lower life satisfaction, purpose in life and self-efficacy. They reported lower social skills, less usage of the coping strategies humour, positive reframing, and acceptance, but more usage of denial and self-distraction strategies.

Sex differences and differences by chronological age were more frequently detected in the PPF area of Patterns of Experience and Behavior than the other PPF areas. Male participants reported less conscientiousness compared with females, less neuroticism, less social sensitivity, and less regular usage of the coping strategies self-distraction, emotional support, instrumental support, and venting. The sex differences in the emotional and support-focused coping strategies (emotional support, instrumental support, venting) observed in the SwiSCI sample largely correspond with findings from other populations (92).

Persons with non-traumatic injuries were less satisfied with life and experienced more loss appraisals than participants with traumatic injuries.

However, subgroup differences were overall small in effect size. The strongest differences were detected for the cognitive appraisal of stressful situations as a challenge. Here, age, age at injury, and the combined subgroups of age at, and time since, injury differed with a medium effect size.

Although the current sample seems to be well adjusted to SCI in showing little negative affect and depressive feelings, those with higher age at injury and shorter time since injury show overall more negative feelings and mood, thoughts, beliefs, motives and patterns of experience and behaviour.

Previous research indicates that older adults with physical disabilities are more likely to report symptoms of depression than younger persons (93). Negative feelings and mood may increase with higher age, when medical complications and dependence on others for assistance increase (94) while a loss of social roles occurs (95). Younger individuals may have a longer time perspective, may have more strategies to cope with the consequences of SCI, and are therefore more likely to go about reaching their life goals (96, 97).

With regards to time since injury, the comparison with previous studies shows mixed results in different PPF areas. For example, in the SwiSCI sample time since injury was unrelated to general self-efficacy, which is in line with previous findings (17). In the current sample, longer time since injury was associated with less depressed feelings and more positive affect, in line with some previous findings on depression, anxiety and distress (98–100), while in other studies level of depressive symptoms increased with longer time since injury (101, 102). Furthermore, in this study, longer time since injury was associated with higher satisfaction with quality of life similar to some earlier research (103, 104), while other studies did not find significant relationships between time since injury and quality of life (105–108). In particular, longitudinal studies indicate that life satisfaction may not necessarily change (94), but that individuals with SCI maintain relatively good and stable life satisfaction over time (102, 109). Research examining trajectories in mental health after SCI revealed a group of individuals with chronic low mental health, a highly resilient group, a group showing early and a group showing delayed recovery from SCI (12, 110).

Overall, the present findings hint at a certain relevance of time-dependent processes, which seem to be yet insufficiently understood in relation to PPFs in persons with SCI and warrants further research.

The current findings must be interpreted with caution, in particular due to limitations regarding the generalizability of the results. Considering the overall response rate of SwiSCI, many individuals with SCI who were potentially eligible for study participation chose not to take part in the data collection. It can be assumed that persons with more negative experience across PPF areas (e.g. higher depression, lower life satisfaction, or higher substance use) and individuals with severe physical and mental health problems are less likely to participate in such type of surveys and thus may be underrepresented in the present sample (111). Therefore, the results may underestimate negative experience of persons with SCI in Switzerland, even though some adjustment for non-response bias has been undertaken in the analyses.

The use of median-splits in the analyses is a further critical point, which can lead to loss of power and loss of information related to the distribution of data. In addition, the generalizability of results can be limited, since the comparison groups are created based on the current sample only. However, median-splits are used in exploratory research in order to create groups of equal size for further analyses, such as ANOVA, and to simplify analyses and reporting in large data-sets. Considering the exploratory nature of the analyses and the small effect sizes, the results for subgroup differences must be regarded as preliminary and require further testing.

Future research with longitudinal study designs is required in order to improve our understanding of time-dependent processes, especially in relation to time since injury, and differentiate between the effects of age and aging, birth cohort, and adjustment processes. Future research also needs to account for complex interrelationships of PPFs and to consider the potential non-linearity of the statistical associations over time. Comparative research between SCI and the general population regarding distributions of PPFs is necessary for the further understanding of functioning and health of persons with SCI. In addition, further conceptual work is required to clarify the potential relationships of PPFs with adjustment, its components and determinants.

Regarding clinical practice, the comparatively more negative experience in the subgroup of older and more recently injured persons suggests a need for specifically tailored and carefully timed psychotherapeutic interventions for this group in order to enhance a more positive emotional experience, more functional cognitions and beliefs, stronger awareness of own motives and acquisition of more adaptive coping strategies.

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